Research Article

Predictors of Clients' Satisfaction with Delivery of Animal Health Care Services in Periurban Ghana

Paa Kobina Turkson

Animal Science Department, School of Agriculture, University of Cape Coast, Cape Coast, Ghana

Correspondence should be addressed to Paa Kobina Turkson, kobbiecc@yahoo.com

The study used logistic regression modelling to determine predictors of satisfaction with delivery of animal health care services for 889 clients (livestock and poultry keepers) in periurban Ghana. Of the 15 indicators tested as predictors of satisfaction in this study, 8 were included in the best fit model. These were accessibility, availability of services, service charge, effectiveness, efficiency, quality of services, meeting client needs, and getting help. Efficiency and effectiveness were perceived by the respondents to be synonymous, as were service quality and effectiveness, as suggested by ORs > 10 when cross tabulated. Therefore, one or the other could be used in future studies but not both to avoid collinearity. The identified predictors could be targeted for improvement in quality of service delivery to livestock and poultry keepers in Ghana.

1. Introduction

Client satisfaction is often a measure of client's perception of quality because the highly satisfied client feels he/she has received a high-quality service, whereas the dissatisfied client is disappointed by the quality of service [1]. In medical literature where such studies are more common, client satisfaction is often referred to as patients' satisfaction [2, 3]. Verbeek et al. [4] reported that patient satisfaction is best defined as patients' evaluation of (aspects of) a health care service based on the fulfilment of their expectations. Williams and colleagues [5] noted that the outcome of a patient's evaluation of services is based on 3 factors: a positive or negative experience; the perceived function of the service; the responsibility of the service for their experience. Vuori [6] observed that patient satisfaction is not just an indicator of health care but is a desired outcome of care, and therefore an essential part of its quality. It is expected that client evaluation would lead to improved quality of care as patient satisfaction is assessed to find out which services need improvement according to the patient's preference [4].

This paper presents findings of a client satisfaction survey and perceptions of quality of veterinary services in Ghana. Major findings have been published in Turkson [7].

This paper, a followup to the earlier publication, has the objective of determining what the predictors of satisfaction with veterinary services are and which model best explains client satisfaction from the indicators used in this study. This could help in improving the quality of services provided to livestock and poultry keepers in Ghana.

2. Methods

The details of the study area, sampling procedure, and survey instrument and administration have been provided in Turkson [7].

Briefly, urban/peri-urban locations in four regions of Ghana were chosen using purposive sampling technique. These were Kumasi Metropolitan Area and surrounding districts in the Ashanti Region; Accra and Tema Metropolitan Areas and Ga District in the Greater Accra Region; Awutu-Efutu-Senya District in the Central Region; Shama-Ahanta East Metropolitan Area and surrounding districts in the Western Region.

2.1. Data Analysis. The responses to the closed questions were coded and stored using Microsoft Excel software. These were imported into Statistix software (version 3.5, Analytical

Software Inc., St. Paul, MN, USA) and summarized using descriptive statistics.

For analysis, the respondents were classified into 2 groups based on the levels of satisfaction. Those who were either very dissatisfied, dissatisfied, or fairly dissatisfied with delivery of veterinary services to their farms were classified into dissatisfied group (making up 52.2%, $n = 889$), while those who were either satisfied or very satisfied were in the satisfied group (forming 47.8%). Differences between those satisfied and those dissatisfied were tested for significance by the χ^2 test at $\alpha = 0.005$.

Modelling was used to determine the predictors of satisfaction with delivery of veterinary services from the indicators tested in this study. The best subsets regression model technique was adopted using Statistix software. The adjusted R^2 and Mallow's C_p were the criteria for the model selection as suggested by Snedecor and Cochran [8] and Weisberg [9]. After the best model was selected, multiple logistic regression was used to generate a logit expression. Logistic regression was appropriate since the dependent variable consisted of "binary" data of "Yes" or "no." The dependent variable was satisfaction (with dummy variable 0 for the dissatisfied group and 1 for the satisfied group). The independent variables tested were responses to questions on effectiveness, efficiency, accessibility, service quality, equity, staff attitude, staff technical competence, service charge, drug costs, drug availability, vaccine availability, service availability, service affordability, client needs met, and ease of getting help. The definitions of these indicators are given by Turkson [7].

For effectiveness, efficiency, accessibility, service quality, equity, staff attitude, and staff technical competence, those who responded very poor, poor, fair, or no idea were put in poor group (with dummy variable 0), while those responding good or very good were classified as good group (with dummy variable 1). For service charge and drug costs, those who responded expensive, very expensive, or no idea were put in expensive group (with dummy variable 0), while those responding fair or reasonable were classified as reasonable Group (with dummy variable 1). For drug, vaccine, and service availability, those who responded unavailable or sometimes available were classified as unavailable group (with dummy variable 0), while those responding available or always available were classified as available group (with dummy variable 1). Those who said services were unaffordable, fairly affordable, or no idea were classified as unaffordable group (with dummy variable 0), while those who responded affordable were put in affordable group (with dummy variable 1). The respondents whose needs were poorly, sometimes, or fairly met were classified as unmet group (with dummy variable 0), while those whose needs were met or very much met were classified as met group (with dummy variable 1). For ease of getting help, those who responded "difficult" or "very difficult" were put in difficult group (with dummy variable 0), while those responding "easy" or "very easy" were classified as easy group (with dummy variable 1). The indicators chosen for the model were not forced, but each coefficient had to have a significant P value at 95% confidence level.

To check for the collinearity of the parameters, pairs were cross tabulated using Statistix, while odds ratios (ORs) were calculated using EpiCalc 2000 version 1/02 [10]. ORs above 10 were interpreted as showing strong collinearity [7].

3. Results

Table 1 presents proportions for responses to questions on satisfaction with delivery of veterinary services in peri-urban Ghana. The differences between those satisfied and those not satisfied with quality of delivery of veterinary services in Ghana differed significantly ($P < 0.05$) with regard to accessibility, affordability, attitude of staff to clients, availability of service, service charge, availability of drugs, effectiveness, efficiency, equity, service quality, technical competence, availability of vaccines, meeting client needs, and getting help when in need. Generally, for each indicator the category denoting a positive inclination (e.g., good, affordable, available, reasonable, need met, and easy), the proportions for those satisfied were significantly higher than those for the dissatisfied respondents, except in the case of drug cost where the reverse was true.

The estimated logit for the best subsets regression model for satisfaction of clients with delivery of veterinary services in peri-urban Ghana was by the following expression:

$$\text{Logit}(x) = -2.99 + 0.38a + 1.00b + 0.58c + 0.59d + 0.60e + 0.65f + 0.87g + 0.42h, \tag{1}$$

where x: Probability of Satisfaction (0 = dissatisfied, 1 = satisfied), a: Accessibility (0 for poor, 1 for good), b: Availability of services (0 for unavailable, 1 for available), c: Service charge (0 for expensive, 1 for reasonable), d: Client needs met (0 for unmet, 1 for met), e: Effectiveness (0 for poor, 1 for good), f: Efficiency (0 for poor, 1 for good), g: Getting help (0 for difficult, 1 for easy), and h: Service quality (0 for poor, 1 for good).

Model (1) had a Marlow's C_p of 9.0 and adjusted R^2 (the percentage of variance explained by the model) of 31.5%.

The cross tabulations of indicators in the model that suggested strong collinearity were Efficiency x effectiveness (OR = 17; $\chi2 = 324.0$; $P < .00001$) and Service quality x effectiveness (OR = 13; $\chi2 = 279.3$; $P < .00001$). Taking these into consideration, 2 other models emerge and are expressed as

$$\text{Logit}(x) = -2.96 + 0.47a + 0.97b + 0.56c + 0.63d + 0.89f + 0.88g + 0.60h, \tag{2}$$

$$\text{Logit}(x) = -2.74 + 0.48a + 0.98b + 0.57c + 0.74d + 1.12e + 0.82g. \tag{3}$$

Table 2 presents the parameters for models (1)–(3). All the variables showed significant P values at $\alpha = 0.05$.

TABLE 1: Indicators of quality of delivery of veterinary services in Ghana.

Indicator		Satisfied %		Dissatisfied %		χ^2	P
		Number	%	Number	%		
Accessibility	Poor	193	35.5	351	64.5	85.39	<.0001
	Good	232	67.2	113	32.8		
Affordability	Unaffordable	186	37.3	312	62.7	49.62	<.0001
	Affordable	239	61.1	153	38.9		
Staff attitude	Poor	52	25.7	150	74.3	51.00	<.0001
	Good	373	54.3	314	45.7		
Service availability	Unavailable	108	26.0	308	74.0	149.5	<.0001
	Available	317	67.0	156	33.0		
Service charge	Expensive	117	33.8	229	66.2	44.44	<.0001
	Reasonable	308	56.7	235	43.4		
Drug availability	Unavailable	134	34.7	252	65.3	46.86	<.0001
	Available	291	57.9	212	42.1		
Drug cost	Expensive	311	48.1	335	51.9	0.11	.74
	Reasonable	114	46.9	129	53.1		
Effectiveness	Poor	126	29.2	306	70.8	117.0	<.0001
	Good	299	65.4	158	34.6		
Efficiency	Poor	130	31.0	289	69.0	89.44	<.0001
	Good	295	62.8	175	37.2		
Equity	Poor	318	44.6	395	55.4	14.84	.0001
	Good	107	60.8	69	39.2		
Service quality	Poor	106	27.5	272	72.5	111.9	<.0001
	Good	319	63.3	185	36.7		
Technical competence	Poor	62	25.9	177	74.1	62.63	<.0001
	Good	363	55.8	287	44.2		
Vaccine availability	Unavailable	138	35.0	256	65.0	46.33	<.0001
	Available	287	58.0	208	42.0		
Client needs	Unmet	122	28.2	311	71.8	130.38	<.0001
	Met	303	66.4	153	33.6		
Getting help	Difficult	59	22.6	202	77.4	94.04	<.0001
	Easy	366	58.3	262	41.7		

TABLE 2: Regression parameters for 3 models of satisfaction of clients with delivery of animal health services in peri-urban Ghana.

Predictor	Model (1)			Model (2)			Model (3)		
	Coefficient	Wald test statistic	P value	Coefficient	Wald test statistic	P value	Coefficient	Wald test statistic	P value
Constant	−2.99	−12.70	<.001	−2.96	−12.62	<.001	−2.74	−12.37	<.001
Accessibility	0.38	2.02	.043	0.47	2.58	.010	0.48	2.61	.009
Service availability	1.00	5.46	<.001	0.97	5.32	<.001	0.98	5.44	<.001
Service charge	0.58	3.23	.001	0.56	3.11	.002	0.57	3.22	.001
Client needs met	0.59	3.26	.001	0.63	3.53	<.001	0.74	4.27	<.001
Effectiveness	0.60	2.70	.007	na	na	na	1.12	6.30	<.001
Efficiency	0.65	3.20	.001	0.89	4.87	<.001	na	na	na
Getting help	0.87	4.27	<.001	0.88	4.35	<.001	0.82	4.11	<.001
Service quality	0.42	2.05	0.040	0.60	3.19	.001	na	na	na

na = not applicable.

4. Discussion

The proportions of those satisfied were significantly higher and the responses more positive than those dissatisfied for all the indicators used to assess quality of services in peri-urban Ghana, except cost of drugs (Table 1). The indicators tested were able to differentiate those satisfied from those dissatisfied. Client satisfaction is a desired outcome of health care delivery and therefore an essential component of quality [6]. Therefore, if indicators that predict dissatisfaction are identified, they could be targeted to help improve service delivery.

Out of 15 indicators tested as predictors of satisfaction in this study, 8 were included in the best fit model. These were accessibility, availability of services, service charge, effectiveness, efficiency, quality of services, meeting client needs, and getting help. These ought to be tested further in other places. A number of these indicators (accessibility, service availability, charges, effectiveness, efficiency, and service quality) are said to influence quality of delivery of AHC systems and by extrapolation client satisfaction [11–17]. In human health services, the most powerful predictor for client satisfaction with government services was identified as provider behaviour especially respect and politeness, and these were more important than the technical competence of the provider [18]. Anecdotal information suggests a similar situation in veterinary services [17].

The results of the cross tabulations indicated that efficiency and effectiveness were perceived by the respondents to be identical or indistinguishable, as were service quality and effectiveness (OR > 10). Effectiveness was defined in this study as how effective the veterinary services were in reducing mortality, disease, discomfort, and dissatisfaction, while efficiency was defined as how well the available resources were used to achieve desirable results. Quality of services was defined as the degree to which services met the client's expectations. It seems that the respondents were not able to sufficiently differentiate these. There is the need in future research to concentrate on using either indicator, rather than both to avoid collinearity. Also, either indicator could be used in prediction models as indicated in models (2) and (3).

This paper has for the first time provided predictors of client satisfaction with delivery of animal health care which could be used in improving quality of delivery of services to livestock and poultry keepers in Ghana and elsewhere.

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